REMARKS

Responsive to the Official Action mailed February 20, 2003, applicants have further revised the claims of their application in an earnest effort to place this case in condition for allowance. Specifically, independent claim 1and 13 have been amended. Reconsideration is respectfully requested.

In the Action, the Examiner has rejected the pending claims under 35 U.S.C. §103, with principal reliance upon U.S. Patent No. 3,692,618, to Dorschner et al., with further reliance upon U.S. Patent No. 4, 107,374, to Kusunose et al., and U.S. Patent No. 4,808,467, to Suskind et al. However, it is respectfully maintained that applicant's novel nonwoven fabric construct is clearly patentably distinct from the teachings of these references, even when combined, and accordingly, the Examiner's rejections are respectfully traversed.

At the outset, the thrust of applicants' invention merits emphasis. In order to achieve a nonwoven fabric construct having unique elongation and tensile strength properties, which can be produced at high-speed, applicants contemplate spunbond formation of a filament nonwoven web, with subsequent hydroentanglement of the substantially continuous filaments. As discussed in the specification, the fabric exhibits unique tensile strength and elongation properties, with tensile strength being maintained attendant to fabric elongation as the hydroentangled filaments disentangle, rather than fracture and break as has been typical with hydroentangled staple length fiber constructs.

Again, applicants' invention contemplates formation of a spunbond nonwoven filamentary web, followed by hydroentanglement with high pressure liquid streams.

A careful study of the principal Dorschner et al. reference shows that it fails to teach or suggest applicants' invention, even when combined with the teachings of the secondary

Kusunose et al. patent. Dorschner et al. contemplates an improvement in the spunbond process by attempting to avoid "stratification", which is understood to refer to layering of fiber bundles as they are collected on an associated carrier surface. At column 7, lines 28 *et seq.*, formation in this fashion is discussed:

> The present invention avoids such stratification by providing for simultaneous formation, intermingling and overlapping of filament, self-bundles, loops and swirls in adjacent lay-down sections.
>
> In the lay-down of the web in accordance with this invention, at least 50% of the width of a section overlaps with the next adjacent section.

The Dorschner et al. reference goes on to state:

> In the present invention, overlapping is achieved without stratification by arranging the air guns in a row straight across the moving carrier belt, i.e., at right angles to the direction of longitudinal movement of a carrier belt to provide an overlapping series of air columns as shown in FIG. 5.

The Dorschner et al. patent contemplates that a web formed in this fashion is "consolidated" to form a useful product. At column 10, line 23 *et seq.*, it is stated:

> Once the web is completely laid down on the carrier surface in accordance with this invention, the web may be consolidated and stabilized by compacting, heat-sealing, needling, and latex treating.

As acknowledged by the Examiner, Dorschner et al. fails to teach or suggest the use of hydroentanglement for web formation. Rather, the clear thrust of this patent is to avoid filament stratification during spunbond formation.

In light of this, it will be readily apparent that the principal Dorschner et al. reference cannot can not provide an appropriate basis for rejecting the pending claims. Applicants' invention contemplates that hydroentanglement be effected *subsequent to* formation of a filamentary web. Dorschner et al. is limited in its teachings to the use of overlapping

filament, self-bundles, loops, and swirls, in adjacent lay-down sections, *as the filaments are being collected.* There is *no teaching* of effecting hydroentanglement subsequent to filament collection. Notably, the consolidation techniques identified in Dorschner et al. do not include hydroentanglement, but rather are limited to compacting, heat-sealing, latex treatment, and needling. It is important to note that needling contemplates mechanical needle-punching with barbed needles, a distinctly different process than hydroentanglement with high-pressure liquid streams.

Since Dorschner et al. is limited in its teachings to the use of the disclosed air streams during collection of the filamentary material, it would clearly be inappropriate, and thus non-obvious, to rely upon the teachings of Kusunose et al. to suggest a modification of the Dorschner et al. process to include liquid streams. As is known in the art, Dorschner et al. employs *air streams* for attenuation and quenching of polymeric filaments during spunbond web formation. *Liquid streams cannot be employed for this purpose.*

Kusunose et al. contemplates formation of an artificial leather product. To this end, fibrous bundles are employed which "may either be in the form of a continuous filament or a staple fiber and may consist of any type of filament or fiber" (column 1, line 63 *et seq.*). The fiber bundle is comprised of a plurality of extremely fine filaments or fibers having a denier of about 0.005 - 0.5 (column 3, lines 3-5). Notably, this patent specifically teaches *away from* the use of filaments having a denier larger than 0.5, stating that "the resultant artificial leather has poor flexural softness" (column 3, lines 10-12).

Kusunose et al. alternatively teaches formation of the fibrous bundles into a fabric for subsequent impregnation with an elastic synthetic polymer by needle-punching, or air or

water jet treatment. At column 8, lines 3 *et seq.*, such treatment is discussed, including the disclosure of various types of barbed and non-barbed needles for needle punching.

At column 8, line 14 *et seq.*, Kusunose et al. states:

> By the action of the needle or said jet of fluid, the fibrous bundle is divided into small bundles, as illustrated in FIGS. 12A through 12D, for example. The bundle of FIG. 12A is composed of two individual fibers which are adhered to each other at certain portions thereof, but which are separated from the other at the remaining portions thereof. In the bundle of FIG. B, several individual fibers are adhered to each other at some portions thereof but are separated from each other at other portions thereof. In the bundle of FIG. 12C, the individual fibers are randomly adhered to the adjacent fibers and are divided from the adjacent fibers at random. In addition, some of the individual fibers are entangled with adjacent fibers at random. FIG. 12D shows a compact bundle composed of fine individual fibers firmly adhered to adjacent fibers.

Thus, this patent contemplates the use of needle-punching, air jets, or water jets to effect separation of fibrous bundles, comprising multiple filaments or fibers, into individualized fibers or filaments, along at least a portion thereof. This patent does not teach or suggest a modification of the Dorschner et al. spunbond formation process, nor does Kusunose et al. teach or suggest the use of high-pressure liquid streams for treatment of collected filamentary elements having a denier of 0.5 - 3 (claim 1), or more particularly 1.0 - 2.5 (claim 13). There is no teaching or suggestion in this reference of achieving a nonwoven fabric having mechanical properties as specifically claimed. This is not surprising since Kusunose merely contemplates use of needle-punching, or air or water jets as an intermediate step for processing fibrous bundles for subsequent impregnation with polymeric material to produce synthetic leather.

In the Action, the Examiner has relied upon the Suskind et al. reference for its teachings relating to certain treatments of the present nonwoven fabric. However, it is

respectfully maintained that this reference fails to overcome the clear deficiencies in the teachings of the principal Dorschner et al. reference, or the secondary Kusunose et al. reference in teaching or suggesting the present invention as claimed.

In summary, applicants must respectfully maintain that notwithstanding the diverse teachings of the prior art, there is a clear absence of any teaching in the art of forming a filamentary spunbond fabric structure, and thereafter hydroentangling the structure to provide a nonwoven fabric having the claimed denier range, with the elongation and tensile strength properties set forth in the present claims. Accordingly, it is believed that claims 1-4 and 6-13 are in condition for allowance, and such action is respectfully solicited. Should the Examiner wish to speak with applicants' attorneys, they may be reached at the number indicated below.

The Commissioner is hereby authorized to charge any additional fee which may be required in connection with this submission to Deposit Account No. 23-0785.

Respectfully submitted,

By_____
Stephen D. Geimer, Reg. No. 28,846

WOOD, PHILLIPS, KATZ, CLARK & MORTIMER
Citicorp Center, Suite 3800
500 West Madison Street
Chicago, Illinois 60661-2511
312/876-1800

CERTIFICATE OF MAILING

I hereby certify that this Amendment is being deposited with the United States Postal Service with sufficient postage at First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on **May 20, 2003**.

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